SAFETY DATA SHEET

PRODUCT NAME	BUTANE GAS CARTRIDGE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

A. PRODUCT NAME — BUTANE GAS CARTRIDGE

B. RECOMMENDED USE OF PRODUCT AND LIMITATIONS

- USE OF PRODUCT — For use Only in Portable Gas Appliances
- LIMITATIONS — Extremely flammable

C. MANUFACTURER,SUPPLIER

- COMPANY — DAE RYUK CAN CO.,LTD. ,MAXSUN CO.,LTD
- ADDRESS — 5th Floor, Korean Women Entrepreneurs Asso, Bldg., 221, Yeoksam-ro, Kangnam-Ku, Seoul, KOREA
- EMERGENCY PHONE NUMBER — +82-2-6003-0600, +82-2-6003-0700

2. HAZARDS IDENTIFICATION

A. CLASSIFICATION — Flammable gases : Category 1

Gases under pressure : Liquified gas

Specific target organ toxicity – single exposure : Category 3(Anesthesia effects)

B. LABEL ELEMENTS, INCLUDING PRECAUTIONARY STATEMENTS

SYMBOLS

- SIGNAL WORDS — DANGER,WARNING
- HAZARD STATEMENTS — H220 Extremely flammable gas
  H280 Contains gas under pressure ; May explode if heated
  H336 May cause drowsiness or dizziness
- PRECAUTIONARY STATEMENTS
  - PREVENTION — P210 Keep away from heat/sparks/open flames/hot surface – No smoking
    P251 ressurized container : Do not pierce or burn, even after use
    P261 Avoid breathing dust/fume/gas/mist/vapours/spray
    P271 Use only outdoors or in a well-ventilated area
  - RESPONSE — P304+P340 IF INHALED : Remove victim to fresh air and keep at rest in a position compotable for breathing
    P312 Call a POISON CENTER or doctor/physician if you feel unwell
    P377 Leaking gas fire : Do not extinguish, unless leak can be stopped safely
    P381 Eliminate all ignition sources if safe to do so
  - STORAGE — P403 Store in a well-ventilated place
    P403+P233 Store in a well-ventilated place. Keep container tightly closed
    P405 Store locked up
    P410+P403 Protect from sunlight. Store in a well ventilated place
  - DISPOSAL — P501 Depose of contents/container in accordance with local/regional /national regulations

C. OTHER HAZARDS WHICH DO NOT RESULT IN CLASSIFICATION (NFPA)

	HEALTH	FIRE	REACTIBILITY
ISOBUTANE	0	4	0
BUTANE	1	4	0
PROPANE	1	4	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

A. MIXTURE

CHEMICAL NAME	SYNONYM	CAS No./ID	CONTENT(w%)
ISO-BUTANE	2-METHYL PROPANE	75-28-5	25 ~35
N-BUTANE	Butane, Liquefied Petroleum Gas	106-97-8	50 ~70
PROPANE	n-Propane, Propylhydride	74-98-6	0 ~ 5

4. FIRST AID MEASURES

A. EYE CONTACT	Get emergency a medical treatment
	Wash skin and eyes with plenty of flowing water over 20 minutes
B. SKIN CONTACT	If suffer from frostbite,flush with plenty of lukewarm water immediately.
	cover up contaminated skin with a blanket. seek medical attention if ill effect or irritation develops
C. INHALATION	Get medical advice/attention if you feel unwell
	Ventilate with fresh air if open exceed mist and fume, get a medical treatment if have a cough and others
D. INGESTION	Prompt medical action is essential.
	Use a breathing eqipment if get breathless by ingestion and inhalation
E. MOST IMPORTANT SYMPTOMS/EFFECT, ACUTE AND DELAYS	Contact with skin or eyes can cause frostbite.
F. INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED, IF NECESSARY	In case of inhalation, consider supplying oxygen.

5. FIRE FIGHTING MEASURES

A. SUITABLE EXTINGUISH MEDIA	Water spray or Fog for surrounding area. Standard form, Special Alcohol-stable foam, Carbon Dioxide-CO2 , Dry Chemical
	Use dried sand and soil if have extinguishment by smothering
B. SPECIFIC HAZARDS ARISING FROM THE CHEMICAL	May burst or explode if exposed to heat or spark.
	Thermal decomposition may produce carbon monoxide and other toxic vapors
	Heavier than the air, and there is a possibility of ignition and backfire.
	May cause explosion if heat up cylinder.
	Low electrical conduction may cause static electricity, and ignited by spark.
	Mixture of gas & air may explode.
C. SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHER	Fire fighters/rescures must put on apposive protector
	Get fire fighting on safty distance
	May be damaged if skin and eyes contact
	May cause pollution by opened contents
	Warning, becouse contents are lighter than water
	Remove cylinder from danger distance if not be dangerous
D.SPECIAL FIREFIGHTING PROCEDURES	Use Equipment or Shielding required to protect personnel against bursting, rupturing or venting containers. Do not heat container. Store below 110°F in a Ventilated area.
E.UNSUAL FIRE AND EXPLISION HAZARDS	At elevated temperatures(over 54℃/130°F) CRV of containers will be operated, but rapidly excess heating or fire will be caused burst or rupture of a container.
	Extremely Flammable. Do not use near fire or flame.

6. ACCIDENTAL RELEASE MEASURE

A. PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES	Avoid heat, flames, sparks and other sources of ignition. Do not touch spilled material. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area deny entry. Remove sources of ignition. Ventilate closed spaces before entering.
B. ENVIRONMENTAL PRECAUTIONS	Prevent flow to sewer/public waters. stop release
C. METHOD AND MATERIALS FOR CONTAINMENT AND CLEANING UP	Stop leak if you can do it without risk Absorb leaked materials with soil and sand, and throw away it to waste treatment If spill is indoors, remove all possible sources of ignition and ventilate area immediately until all gases and vapors have been removed

7. HANDLING AND STORAGE

A. PRECAUTIONS FOR SAFE HANDLING	Get handling after read all precautionary statements Avoid breathing dust/fume/gas/mist/vapours/spray Do not spray to flash resource point or flammable Avoid contact with skin and eyes Empty containers should not be re-used Protect cylinders from physical damage Use in a well-ventilated area
B. CONDITIONS FOR SAFE STORAGE	Keep away from heat/sparks/open flames/hot surface - No smoking Store in locking machanism system and not youth handling Store in cool, well-ventilated area away from heat, spark or fire Keep away from foods and drinks Protect against direct sun radiation and storage under 40℃

8. EXPOSURE CONTROLS/PESONAL PROTECTION

A. EXPOSURE LIMITS IN THE AIR OF THE WORKPLACE, BIOLOGICAL LIMIT VALUES

Iso-Butane:

OSHA TWA	No data
ACGIH TWA	800ppm(1900mg/㎥)
NIOSH recommended TWA 10 hour(s)	800ppm(1900mg/㎥)

Propane:

OSHA TWA	1000ppm(1800mg/㎥)
ACGIH TWA	2500ppm
NIOSH recommended TWA	1000ppm(1800mg/㎥)

N-Butane:

OSHA TWA	800ppm(1900mg/㎥)
ACGIH TWA	800ppm
NIOSH recommended TWA	800ppm(1900mg/㎥)
EXPOSURE STANDARD	Industry safety & health law

B. APPROPRIATE ENGINEERING CONTROLS	Provide adequate ventilation Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

C. INDIVIDUAL PROTECTION MEASURE

RESPIRATORY PROTECTION	An approved breathing apparatus may be appropriate. in case of emergency or leak, use a respirator
Eye Protection	For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lences should not be worn. Provide an emergency eye wash fountain and quick drench shower in
Body Protection	For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.
Hand Protection	Wear insulated gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES	N-Butane	Iso-Butane	Propane
A. APPEARANCE FORM	liquid & vapor	liquid & vapor	liquid & vapor
APPEARANCE COLOR	colorless	colorless	colorless
B. ODOR	faint odor	faint odor	faint odor
C. ODOR THRESHOLD	No data	No data	No data
D. pH	Not applicable	Not applicable	Not applicable
E. MELTING/FREEZING POINT	-138℃	-160℃	-187℃
F. INITIAL BOILING POINT AND RANGE	-1℃	-12℃	-42℃
G. FLASH POINT	-60 ℃ (c.c.)	-88℃	-104℃
H. EVAPORATION RATE	No data	No data	No data
I. FLAMMABILITY(SOLID, GAS)	flammable gas	flammable gas	flammable gas
J. UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	1.8-8.4 vol%	1.8-8.4 vol%	2.2-9.5 vol%
K. VAPOR PRESSURE	1557mmHg (at 20℃)	2280mmHg (at 20℃)	5625mmHg (at 20℃)
L. SOLUBILIY	3.25mL/100mL(at 20℃)	No data	0.007g/100mL (at 20℃)
M. VAPOR DENSITY	2.10 g/cm3(air=1)	2.59 g/cm3(air=1)	1.55 g/cm3(air=1)
N. RELATIVE DENSITY	0.578 (20℃/4℃ liquid)	0.578 (20℃/4℃ liquid)	0.501 (20℃/4℃ liquid)
O. PARTITION COEFFICIENT OF n-OCTANOL/WATER	log Pow 2.89	log Pow 2.80	log Pow 2.36
P. AUTO-IGNITION TEMPERATURE	287℃	460℃	466℃
Q. DECOMPOSITION TEMPERATURE	No data	No data	No data
R. VISCOSITY	No data	No data	No data
S. EXPLOSIVE PROPERTIES	No data	No data	No data

10. STABILITY AND REACTIVITY

A. CHEMICAL STABILITY	Material is stable under normal conditions. Ignition by high temperature surface or flame.
B. POSSIBILITY OF HAZARDOUS REACTIVITY	Stable at a normal temperature and pressure. If contact with strong oxidizers, ignition or explosion may be caused by violent reaction.
C. CONDITION TO AVOID	Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Containers may rupture or exposed to heat
D. INCOMPATIBLE MAERIALS	Strong oxidizers such as hydrogen peroxide,nitric acid,sulphuric acid,etc.
E. HAZARDROUS DECOMPOSITION PRODUCT	Toxic carbon compounds(CO2,etc)

11. TOXICOLOGICAL INFORMATION

A. INFORMATION ON THE LIKELY ROUTES OF EXPOSURE

INHALATION EXPOSURE	Irritation, vomiting, difficulty in breathing, irregular heart beating, headache, sleepiness, dizziness, spasm, coma.
INGESTION EXPOSURE	May cause ingestion irritation.
SKIN EXPOSURE	Frostbite.
EYE EXPOSURE	Frostbite.

B. DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT AND LONG TERM EXPOSURE

ACUTE TOXIC	
ORAL	LD50(rat) :No data
SKIN	LD50(rabbit) :No data
INHALATION	LD50(rat) :658,000mg/m3,LD50(mouse) :680,000mg/m3
SKIN CORROSION/IRRITATION	No data
SERIOUS EYE DAMAGE/IRRITANT	No data
RESPIRATORY SENSITIZATION	No data
SKIN SENSITIZATION	No data
CARCINOGENICITY	
KOREAN INDUSTRIAL RAW OF SAFETY AND HEALTH	No data
KOREAN DEPARTMENT OF LABOR	No data
IARC	No data
OSHA	No data
ACGIH	No data
NTP	No data
EU CLP	No data
GERM-CELL MUTAGENICITY	No data
GENERATIVE TOXICITY	No data
SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE	No data
SPECIFIC TARGET ORGAN TOXICITY - REPEATED EXPOSURE	No data
ASPIRATION HAZARD	No data

12. ECOLOGICAL INFORMATION

A. AQUATIC/TERRESTRIAL ECOLOGY TOXICITY

FISH	No data
DAPHNIA	No data
ALGAE	No data

B. PERSISTENCE AND DEGRADABILITY

PERSISTENCE	Not applicable
DEGRADABILITY	No data

C. BIOACCUMULATIVE POTENTIAL

BIODEGRADATION	No data
BIOACCUMULATION	No data
D. MOVILITY IN SOIL	Adsorbs to soil and has low mobility
E. OTHER HAZARDROUS EFFECTS	No data

13. DISPOSAL CONSIDERATIONS

A. DISPOSAL METHODS	All disposal practices must be in compliance with all law and regulations Consult local, state, and federal regulations for specific requirements
B. PRECAUTIONS	the contents of containers must be disposed according to related regulations Disposal should be in accordance with applicable regional,national and local laqs and regulation

14. TRANSPORT INFORMATION

A. UN NUMBER	UN2037 -PROPANE:UN1075 -ISO-BUTANE:UN1999 -N-BUTANE:UN1011
B. UN PROPER SHIPPING NAME	RECEPTACLES, SMALL, CONTAINING GAS(GAS CARTRIDGES) without a release device, non-refillable
C. HAZARD CLASS(ES)	Class 2.1
D. PACKING GROUP	No data
E. MARINE POLLUTANT SUBSTANCES	Not applicable
F. SPECIAL PRECAUTIONS FOR USER	Passenger plane or train:Prohibited

15. REGULATORY INFORMATION

A. REGULATORY INFORMATION	This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

B. SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE PRODUCT IN QUESTION:

1)USA

CERCLA SECTION 103 (40CFR302.4)	Not regulated
SARA SECTION 302(40CFR355.30)	Not regulated
SARA SECTION 304(40CFR355.40)	Not regulated
SARA SECTION 313(40CFR372.65)	Not regulated
SARA SECTION 311/312 (40CFR370.21)	Acute:Yes Chronic:No Fire:Yes Reactivity:No Sudden Pressure:Yes
OSHA PROCESS SAFETY(29CFR1910.119	Not regulated

2)EU classification and Labelling information

CLASSIFICATION	F
RISK PHRASES	R12:Extremely flammable
SAFTY PHRASES	S2:Keep out of the reach of children S9:Keep container in a well-ventilated place S16:Keep away from sources of ignition - No smoking

16. OTHER INFORMATION

A. SOURCE OF DATA

ECB-ESIS(European chemical Substances Information System)(http://ecb.jrc.it/esis)
ECOTOX Database, EPA(http://cfpub.epa.gov/ecotox)
HSDB, U.S. National Library of Medicine(http://toxnet.nlm.nih.gov)
IUCLID Chemical Data Sheet, EC-ECB
International Chemical Safety Cards(ICSC)
http://www.nema.go.kr/hazmat/
http://ncis.nier.go.kr
Corporate Solution From Thomson Micromedex(http://csi.micromedex.com)
ECB-ESIS(European chemical Substances Information System)(http://ecb.jrc.it/esis)
International Chemical Safety Cards(ICSC)(http://www.nihs.go.jp/ICSC)
TOXNET, U.S. National Library of Medicine(http://toxnet.nlm.nih.gov)
The Chemical Database, The Department of Chemistry at the University of Akron (http://ull.chemistry.uakron.edu/erd)
NLM:HSDB
NLM:ChemIDPlus
TOMES:Loli
TOPKAT:Skin Irritation

Ecological Structure Activity Relationships(ECOSAR)

Korea Occupational Safety & Health Agency

EPI Suite

Quantitative Structure Activity Relation(QSAR)

Globally Harmonized System of classification and labeling of chemical(GHS), United Nations.

B. THE DATE OF PREPARATION OF THE SDS: December. 22. 2012

C. THE NUMBER OF TIMES REVISED AND THE DATE OF PREPARATION OF THE LATEST REVISION

THE NUMBER OF TIMES REVISED: No. 1

THE DATE OF PREPARATION OF THE LATEST REVISION: January. 23. 2015

D. OTHERS